

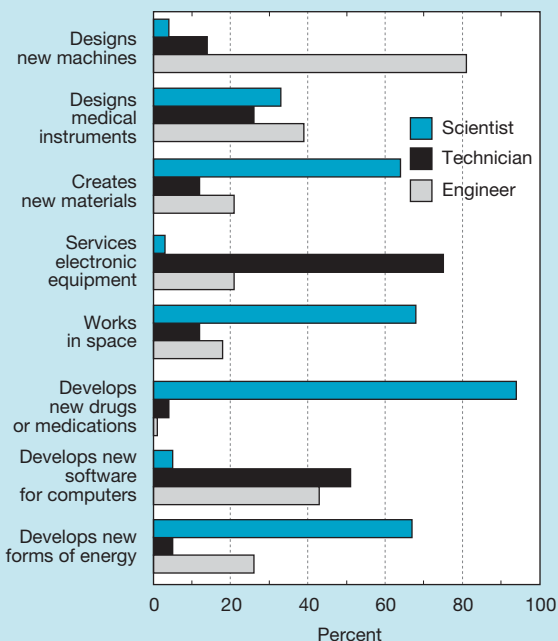
have a much larger role in conducting space research, developing new forms of energy, and creating new materials than the public gives them credit for. (See figure 7-16.) In addition, they are “perceived as pragmatic contributors to society—more so than are technicians—but are less attuned to societal issues than are scientists.” (See figure 7-17.)

## Where Americans Get Information About S&T

### Science on the Internet

Has the Internet displaced television and the print media as Americans’ primary source of news about current events or S&T? According to a 2000 Pew Research Center survey, the Internet is making inroads. Apparently, part of the time Americans used to spend watching the news broadcasts of ABC, CBS, NBC, and Fox is now being used to browse various news-oriented websites. (See sidebar “More Americans Are Turning to the Internet for News.”) In addition, people who have access to the Internet at home seem to know more about science and the scientific process and have more positive attitudes toward S&T. (See sidebar “Internet Access Is an Indicator of Both Attitudes Toward and Knowledge of S&T.”)

Figure 7-16.  
**Who does what—scientists, engineers, or technicians : 1998**

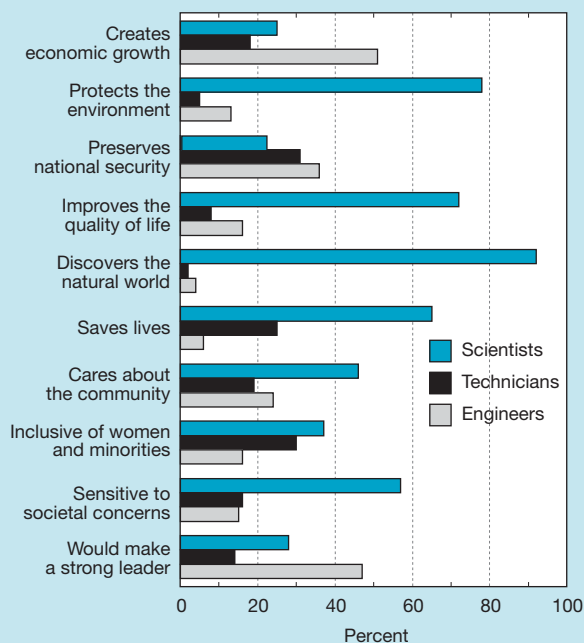


NOTE: Responses were to the question, “As I mention some activities, tell me who you *mostly* associate with that activity—a scientist, a technician, or an engineer?”

SOURCE: Louis Harris & Associates, Inc. “American Perspectives on Engineers & Engineering.” A “Harris Poll” Pilot Study conducted for the American Association of Engineering Societies. July 1998.

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Figure 7-17.  
**Public perception of scientists, engineers, and technicians: 1998**



NOTE: Responses were to the question, “As I mention some characteristics, who first comes to mind—scientists, technicians, or engineers?”

SOURCE: Louis Harris & Associates, Inc. “American Perspectives on Engineers & Engineering.” A “Harris Poll” Pilot Study conducted for the American Association of Engineering Societies. July 1998.

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Despite its growing popularity, the Internet ranks a distant third as Americans’ chief source of news in general. Only 7 percent of respondents to the NSF survey identified it as their main source of information about what is happening in the world around them. In contrast, 53 percent of those surveyed identified television, and 29 percent said that they got most of their information about current news events from newspapers. The corresponding statistics for radio and magazines are 5 and 3 percent, respectively. (See figure 7-19 and appendix table 7-42.)

Although 9 percent of respondents to the 2001 NSF survey said that the Internet was their main source of information about S&T, this percentage is still substantially below the percentage of respondents who identified television (44 percent), newspapers (16 percent), and magazines (16 percent) as their primary source of S&T news. (See figure 7-19 and appendix table 7-43.)

The Internet, however, is the preferred source when seeking information about specific scientific issues. The following question was asked in the 2001 NSF survey: “If you wanted to learn more about a scientific issue such as global warming or biotechnology, how would you get more information?”

The response to this question makes it clear that encyclopedias and every other information resource have lost a substantial number of customers to the Internet. A plurality (44

## More Americans Turning to the Internet for News

Surveys conducted by the Pew Research Center (Pew Research Center for the People and the Press 2000b) show the Internet displacing network television as a source of news in some U.S. households.\* (See figure 7-18.) The trend is most noticeable in the homes of younger, more affluent, and better educated survey participants. A majority of daily Internet news consumers (61 percent) are men, 75 percent are under 50, and 47 percent have a college education. Half have family incomes of \$50,000 or more. This finding holds true only for news programs on the broadcast networks (ABC, CBS, NBC, and Fox). Cable news channels, daily newspapers, and radio news seem unaffected by Internet usage.

In 1998, 59 percent of two groups, those who regularly obtained news online (Internet users) and those who did not (nonusers), reported that they watched television news on a typical day. Two years later, the percentage of Internet users watching television news had dropped to 53 percent; the corresponding statistic for nonusers remained at 59 percent. Moreover, Internet users are spending less time watching news shows. That is, the percentage of Internet users reporting that they watched at least a half-hour of television news on a typical day fell from 48 percent in 1998 to 40 percent in 2000. In contrast, there was almost

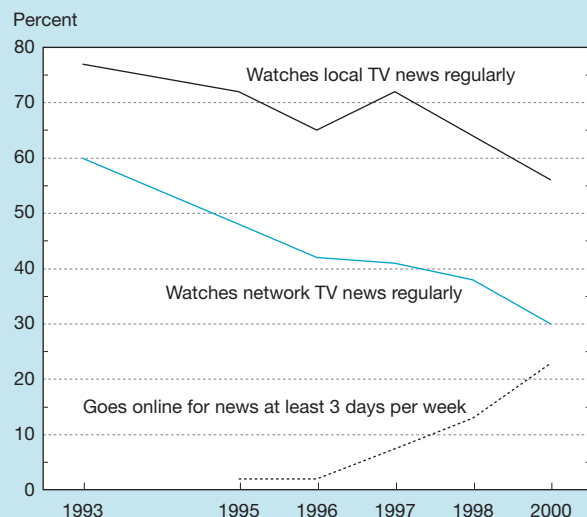
no change for the nonuser group: 49 percent in 1998 versus 47 percent in 2000. The data show that even when demographic variables such as sex, age, and level of education (factors associated with both watching the news and Internet access) are taken into account, Internet users are significantly less likely to watch network news than those not using the Internet.

Internet users are also less likely than nonusers to watch other network news programs, including morning shows like *The Today Show* and evening news magazines like *60 Minutes*. For example, 28 percent of Internet users said that they regularly watched network news magazines compared with 34 percent of nonusers.

Text table 7-6 shows the most popular types of news sought online by Internet users. Weather, science/health, and technology are at the top of the list.

Americans who regularly get news online are more interested than non-Internet users in news about science and technology, business and finance, and sports. For example, 22 percent of those who got news online at least once a week said that they follow news about science and technology very closely compared with just 14 percent of those who did not go online. (See text table 7-1.)

Figure 7-18.  
U.S. public viewing broadcast news  
versus online news



SOURCE: Pew Research Center for the People and the Press, "Internet Sapping Broadcast News Audience: Investors Now Go Online for Quotes, Advice." Biennial Media Consumption Survey, June 11, 2000. <http://www.people-press.org/media00rpt.htm>.

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\*The percentage of Americans saying they enjoy keeping up with the news has declined steadily since the mid-1990s. The generational divide on these questions is striking (Pew Research Center for the People and the Press 2000c).

Text table 7-6.  
Online news topics for which people go online:  
2000

News topic	Internet news consumers (percent)		
	All	Men	Women
Weather .....	66	68	64
Science and health .....	63	60	67
Technology .....	59	72	45
Business .....	53	62	43
International .....	45	51	38
Entertainment .....	44	40	47
Sports .....	42	57	27
Political .....	39	44	34
Local .....	37	35	39

SOURCE: Pew Research Center for the People and the Press, "Internet Sapping Broadcast News Audience: Investors Now Go Online for Quotes, Advice," Biennial Media Consumption survey (Washington, DC, June 11, 2000). Available at <<http://www.people-press.org/media00rpt.htm>>.

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## Internet Access an Indicator of Both Attitudes Toward and Knowledge of S&T

People who have access to the Internet at home seem to harbor fewer reservations about S&T than those who do not have access at home. They may also have more knowledge of science and the scientific process than their no-access counterparts. Although the differences in attitudes and knowledge are the most striking among those whose highest level of formal education is a high school diploma, differences exist even among those having college degrees.

In 2001, 59 percent of those responding to the NSF survey said that they had access to the World Wide Web (WWW) at home. Given how much the so-called digital divide has been in the news, it is not surprising to see access strongly correlated with level of education, in terms of both formal education and number of math and science courses completed. In addition, this question produced a sizable gender gap; 63 percent of men said that they had home access, compared with 55 percent of women. (See appendix table 7-41.)

Those having access to the Internet at home harbor fewer reservations about science. For example:

- ◆ 43 percent of those having access to the WWW from home agreed with the statement “we depend too much on science and not enough on faith” compared with 60 percent of those without access;
- ◆ 30 percent of those having access agreed with the statement “science makes our way of life change too fast” compared with 50 percent of those without access; and
- ◆ 78 percent of those having access agreed that the benefits of scientific research outweigh the harmful results, compared with 63 percent of those without access.

In addition, 85 percent of those with access to the WWW from home, but only 75 percent without access, agreed with the statement: “Even if it brings no immediate benefits, scientific research that advances the frontiers of knowledge is necessary and should be supported by the Federal Government.” However, this difference was entirely attributable to

those without college degrees. Among college graduates, there are almost no differences in the percentages of respondents agreeing with the statement.

Responses to the knowledge questions on the survey reveal major differences between those who have access to the Internet and those who do not. For each of the knowledge questions, the percentage of correct responses given by respondents in the “access” group was higher—and for most questions, substantially higher—than the percentage of correct responses given by respondents in the “no access” group. For example:

- ◆ 56 percent of respondents in the access group knew that electrons are smaller than atoms compared with 36 percent of those in the no-access group;
- ◆ 61 percent knew that antibiotics do not kill viruses (compared with 36 percent);
- ◆ 52 percent knew that humans did not live at the same time as dinosaurs (compared with 41 percent);
- ◆ 83 percent knew that light travels faster than sound (compared with 67 percent); and
- ◆ 84 percent knew that Earth goes around the Sun and not vice versa (compared with 63 percent).

Even among college graduates responding to the survey, those with Internet access at home were more likely than those without access to respond correctly to most of the knowledge questions in the survey.

Among all survey respondents, 37 percent of those with access to the WWW at home were deemed to have an understanding of the scientific process, compared with 19 percent of the no-access group. For the access group, 48 percent of those with just a bachelor’s degree and 56 percent of those with a graduate or professional degree met the criteria for understanding the scientific process. The comparable percentages for the no-access group were 32 and 48 percent, respectively.

percent) of those surveyed chose the Internet as the resource they would use to look up information on the two scientific issues. About half as many (24 percent) chose books or other printed material. No other source, for example, magazines (8 percent), television (6 percent), or newspapers (4 percent), scored above 10 percent. (See figure 7-19 and appendix table 7-44.)

Although it is safe to conclude that the Internet is affecting what Americans know about S&T, it is also true that what most of them know about the latest developments in these subjects comes primarily from watching television.

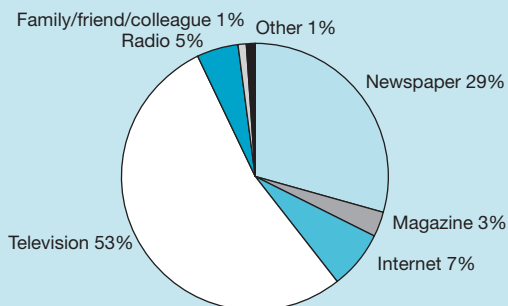
## Science on Television

When most people think about science on television, their first thoughts are probably about educational series, like *NOVA*, on Public Broadcasting Service (PBS) programming, or programs aimed at children, such as *Bill Nye the Science Guy*. In addition, most U.S. households now have access to cable television or satellite systems (see appendix table 7-45), so many Americans are also aware of the Discovery Channel and its mostly science-related offerings.<sup>42</sup> Although

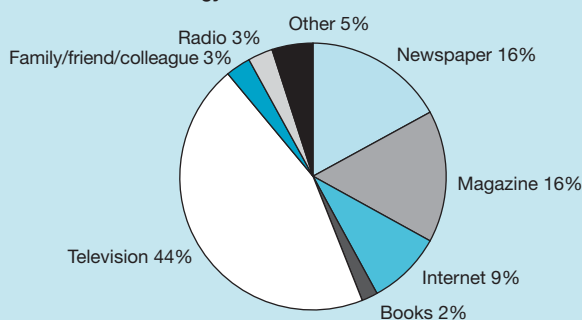
<sup>42</sup> In March 2000, a two-hour special on the Discovery Channel, “Raising the Mammoth,” drew 10.1 million viewers, the largest audience for a documentary in the history of basic cable television. Although a sequel, “Land of the Mammoth,” attracted an audience only half the size of the original, that was still a laudable showing for a basic cable program (Carter 2001).

Figure 7-19.  
Leading source of information: 2001

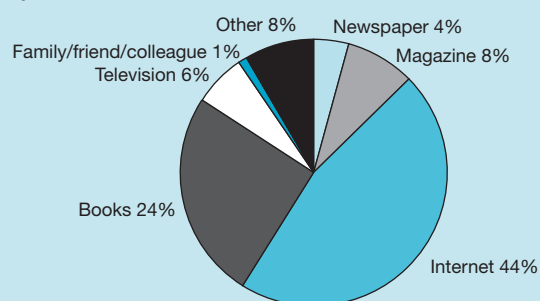
**Current news events**



**Science and technology**



**Specific scientific issue**



NOTE: Percentages may not sum to 100 because "Don't know" responses are not shown.

See appendix tables 7-42, 7-43, and 7-44.

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programs and documentaries on PBS and the Discovery Channel are highly regarded, their audiences are relatively small. (See appendix table 7-46.) Other types of programming such as evening and morning news broadcasts and news magazines like *60 Minutes*, *20/20*, and *Dateline* reach far more people. Therefore, most television viewers are exposed to information about S&T from news shows and news magazines that occasionally cover these subjects.<sup>43</sup>

<sup>43</sup>Science also shows up in entertainment programming, for example, children conducting science experiments on *Late Night with David Letterman*, or in an occasional storyline in a long-running show like *Friends* in which one of the characters is a research scientist. Also, each episode of *The West Wing* usually contains a science-related storyline. Because shows like these draw such large audiences, their conveying of information about science and science policy should not be discounted. They provide information and shape

In response to the 2001 NSF survey, 90 percent of adults said they watched television news reports or news shows every day (63 percent) or a few times a week (27 percent).<sup>44</sup> (See appendix table 7-47.) In addition, 31 percent said that they watched television news magazines like *60 Minutes*, *20/20*, or *Dateline* regularly or most of the time, and 52 percent said that they watched those shows occasionally.<sup>45</sup> (See appendix table 7-46.) These television news magazines can be a leading source of news about science for the public, including members of Congress; for example, a *60 Minutes* segment on cloning humans was shown at the beginning of a March 28, 2001, hearing held by the Oversight and Investigations Subcommittee of the House Energy and Commerce Committee.

According to the 2001 NSF survey, 8 percent of Americans watch *NOVA* regularly or most of the time, and 29 percent watch the series occasionally. Twenty-two percent said they regularly watched public television programs other than *NOVA*, and 49 percent said they occasionally watched such programs.<sup>46</sup> Not surprisingly, a positive relationship exists between watching *NOVA* (as well as other PBS programs) and level of formal education. For example, 15 percent of those who had a graduate or professional degree said they watched *NOVA* regularly, compared with 11 percent of those who had only a bachelor's degree, 7 percent of those who had only a high school degree, and 4 percent of those who had not graduated from high school. Those who had a bachelor's or higher degree were also more likely than others to watch other PBS programs. (See appendix table 7-46.) In response to a Pew Research Center survey, 37 percent said that they regularly watched documentaries on cable channels such as the History Channel or the Discovery Channel. More men (43 percent) than women (31 percent) said that they watched these shows.

attitudes. A recent example of the influence of television on public opinion illustrates this point. During the 2000 presidential campaign, it was hard not to notice that a lot of voters were getting political news from entertainment talk shows, not just those on Sunday morning or the cable news networks or *Nightline*. Almost all major candidates felt compelled to do the talk show circuit, to appear on the *Late Show with David Letterman*, the *Tonight Show*, or the *Oprah Winfrey Show*, because of the growing recognition that their appearances on such shows proved to be an effective way of reaching Americans who do not watch the news or read a newspaper (Pfau et al. 2001).

<sup>44</sup>According to another survey (Pew Research Center for the People and the Press 2000b), the percentage of Americans who report watching a nightly network news program has been declining significantly for more than a decade, from 71 percent in 1987 to 65 percent in 1995, 59 percent in 1998, and 50 percent in 2000.

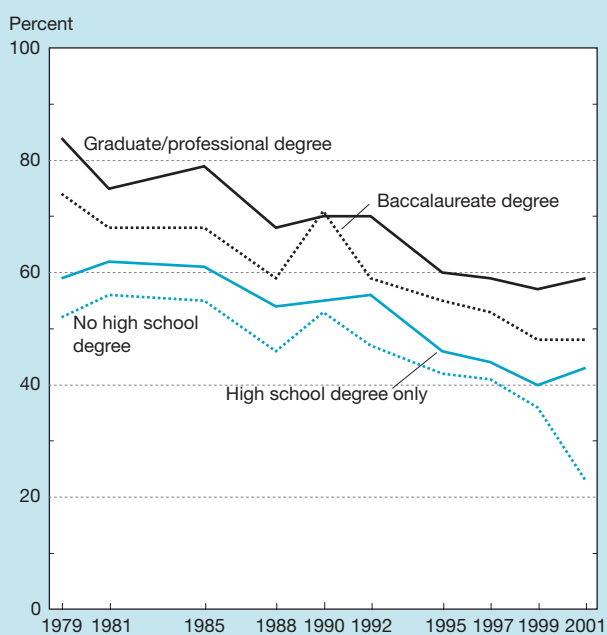
<sup>45</sup>According to the Pew Research Center survey, the percentage of Americans who say they regularly watch news magazines such as *20/20* and *Dateline* dropped from 37 percent in 1998 to 31 percent in 2000. Audiences for the three network morning shows also decreased, but by a smaller amount, during the past two years.

<sup>46</sup>According to the Pew Research Center survey, PBS viewership has remained stable.

## Science in Newspapers and Museums

The decline in newspaper readership during the past decade has been well documented. According to the NSF survey, the percentage of all adults who read a newspaper every day dropped from 57 percent in 1990 to 41 percent in 1999. The decline is apparent at all education levels and continued for the less-than-high-school-education group through 2001. However, newspaper readership among the other three education groups either rose or stayed the same between 1999 and 2001, indicating that the overall decline in newspaper readership may have leveled off in recent years.<sup>47</sup> (See figure 7-20 and appendix table 7-48.)

Figure 7-20.  
U.S. public reading a daily newspaper: 1979–2001



See appendix table 7-47.

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Sixty-six percent of those surveyed in 2001 reported that they had visited a science or technology museum at least once during the past year, the highest level of museum attendance ever recorded by the NSF survey. Museum attendance is positively related to formal education and attentiveness to S&T. (See appendix tables 7-45, 7-49, and 7-50.)

<sup>47</sup>Data from the Pew Research Center also show a recent leveling off in the decline in newspaper readership. Data from the center show 47 percent of whites reading a daily newspaper compared with 37 percent of blacks and 32 percent of Hispanics. However, blacks are somewhat more likely (60 percent) than whites (56 percent) to watch TV news. In addition, weekly news magazines, such as *Time* and *Newsweek*, have lost readers. In 2000, only 12 percent reported that they regularly read a news magazine; the corresponding statistics in 1996 and 1993 were 15 and 24 percent, respectively.

## Science Fiction and Pseudoscience

### Interest in Science Fiction

According to renowned physicist Stephen Hawking, “science fiction is useful both for stimulating the imagination and for diffusing fear of the future.” Interest in science fiction may affect the way people think about or relate to science. For example:

- ♦ Interest in science fiction may be an important factor in leading men and women to become interested in science as a career. Although it is only anecdotal evidence, found on Internet discussion lists, for example, scientists often say they were inspired to become scientists by their keen interest in science fiction as children.
- ♦ It is useful to discover whether interest in science fiction is a possible indicator of positive attitudes toward S&T. For example, one study found a strong relationship between preference for science fiction novels and support for the space program.<sup>48</sup>

Thirty percent of those participating in the 2001 NSF survey said that they read science fiction books or magazines. (See appendix table 7-51.) The positive relationships that exist between reading science fiction and level of education, number of math and science courses completed, and attentiveness to science and technology are interesting, yet predictable. However, another finding is contrary to conventional wisdom. That is, there does not seem to be a gender gap: nearly equal percentages of men (31 percent) and women (28 percent) report that they read science fiction books or magazines. (See appendix table 7-51.)

However, a difference does exist with respect to watching science fiction television programs. For example, the Sci Fi channel is watched by more men (55 percent) than women (45 percent) (Brown 2000). In contrast, women make up the majority of the viewing audience of almost every other television network except the sports networks.

In response to the 2001 NSF survey, 35 percent of men reported that they watched any of the *Star Trek* series either regularly (12 percent) or occasionally (23 percent), compared with 28 percent of women who watched either regularly (10 percent) or occasionally (18 percent). There does not seem to be a relationship between level of education and watching *Star Trek*. (See appendix table 7-52.)

The *X-Files* is a show that focuses more on pseudoscience than science fiction. About 15 percent of those surveyed said they watch the show regularly, and another 28 percent said that they watch it occasionally. Those with more formal education are less likely than others to watch the show. (See appendix table 7-52.)

<sup>48</sup>The same study also found that students who read science fiction are much more likely than other students to believe that contacting extraterrestrial civilizations is both possible and desirable (Bainbridge 1982).